Is there offsite contamination related to the Rocky Flats site? Does it pose a risk?

Substantial offsite sampling has been conducted over many years by many different entities and these studies have shown generally consistent results. The most extensive offsite sampling was done as part of the Comprehensive Environmental Response, Compensation and Liability Act / Resource Conservation and Recovery Act (CERCLA/RCRA) investigation that covered a 38-square mile area to the north, east and south of Rocky Flats known as Operable Unit 3 – Offsite Areas (OU 3). During this investigation, 144 surface soil samples were collected from 61 different 10-acre sample plots. Only 19 of these plots showed plutonium concentrations above background levels; the rest were below background. Of the 19, only one had a plutonium concentration that exceeded one picocurie (trillionths of a curie) per gram (pCi/g) (this sample result was 2.95 pCi/g). An additional 190 sub-surface samples were obtained from 11 different trenches dug as part of the investigation. The subsurface investigation demonstrated that offsite plutonium contamination quickly declines with depth, and reaches background levels within about four inches of the surface.

Results from several of the numerous studies conducted in offsite areas near Rocky Flats are combined in the following text box to provide a representation of the residual plutonium concentrations in surface soils adjacent to the Rocky Flats site.

Combined results from studies conducted in offsite areas near Rocky Flats.

South of Rocky Flats (within a mile south of the refuge's boundary)

- Number of samples = 77
- Average concentration = 0.05 picocuries per gram (pCi/g) (picocurie = trillionth of Curie)
- Highest concentration = 0.27 pCi/g

North of Rocky Flats (Boulder, Broomfield, Superior)

- Number of samples = 12
- Average concentration = 0.04 pCi/g
- Highest concentration = 0.09 pCi/g

East of Rocky Flats (within a mile east of Indiana Street)

- Number of samples = 120
- Average concentration = 0.72 pCi/g
- Highest concentration = 7.56 pCi/g

Because the offsite investigations varied in their sampling methodology, analytical methods and reported units over the years, it is difficult to compare them directly. Of these many studies, only the Operable Unit 3 sampling was performed with sufficient quality assurance and quality control to be used in that study's evaluations including the risk assessment. However, the results from these studies generally agree with and support each other so that several conclusions can be drawn:

- Plutonium was released from the site so that levels in some offsite areas, especially directly east of the former east entrance, are above background levels.
- Plutonium concentrations immediately south of the Rocky Flats site are generally within the range of background values. Even the highest recorded value is an order of magnitude below the low end of the regulatory risk range for residential use.
- Concentrations of plutonium in soil samples collected north of the site are all within the range of background values indicating little, if any, influence from Rocky Flats.
- The highest offsite concentrations of plutonium are found in open space lands directly east of the former east entrance to the site. This contamination resulted from a wind-blown plume that extends back to a drum storage pad that used to exist on the east side of the former Industrial Area onsite. To the north, east and south of this pocket of contamination, plutonium levels quickly diminish to near background. The highest levels measured are approximately equivalent to a four in a million risk of excess cancer to a hypothetical full-time resident; the average value is well below the low end of the acceptable residential risk range.
- Besides plutonium, many samples were also analyzed for other radionuclides, metals, pesticides and volatile organic compounds. None of these constituents were found at levels that would pose a threat to human health or the environment.

The final regulatory decision for Operable Unit 3 (Offsite Areas) was that no cleanup action was necessary to protect human health or the environment because contaminant levels are so low. This decision was based on a three-volume Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation report that provided data on surface water, ground water, surface soil, subsurface soil, sediments and air.

Volume I of the Recovery Act Facility Investigation/Remedial Investigation report

https://www.lm.doe.gov/cercla/documents/rockyflats_docs/OU03/OU03-A-000465.pdf

The Operable Unit 3 study included the results from a 1991 sampling effort that collected 47 samples from soils directly east of the former east entrance to Rocky

Flats. One of these samples recorded the highest level of plutonium ever observed in any off-site sample - 6.5 pCi/g. Under a residential use scenario (the most protective scenario), a plutonium concentration of 6.5 pCi/g equates to a risk of about three in a million +chance of developing cancer as a result of a lifetime of exposure to contamination at this level. The cleanup goal at Superfund sites is to achieve a residual cancer risk somewhere between one in 10,000 and one in a million, so a three in a million risk is considered quite protective. The state's radiation dose limit for the public is 25 millirem per year (mrem/yr). The Total Effective Dose Equivalent to a resident from 6.5 pCi/g is 0.026 mrem/yr – well below the state's limit.

Several other sampling efforts have produced similar results. For example, an independent Citizens' Environmental Sampling Committee performed a soil and sediment sampling study in 1996. The 78 samples collected ranged in concentration from background up to 4.5 pCi/g. The study concluded that these results "are consistent with the numerous other studies of off-site soils and sediments conducted by a variety of agencies over the years."